



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

TAKAHASHI, *et al.*

Serial No.: 10/790,013

Filed: March 2, 2004

For: HEAT TREATMENT APPARATUS AND CLEANING  
METHOD OF THE SAME

Art Unit: 1746

Examiner: Kornakov, Michail

Atty. Dckt: 033082M0871

**PRE-APPEAL BRIEF REQUEST FOR REVIEW**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**Mail Stop: AF**

Dear Sir:

Applicants request review of the final rejection in the above-referenced application. No amendments are being filed with this request.

This Request is being filed with a Notice of Appeal.

The Review is requested for the reasons stated on the attached sheets.

I am the Attorney of Record.

Respectfully submitted,

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Date: March 6, 2006

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## REASONS FOR REVIEW REQUEST

### The Claimed Invention

The claimed invention is directed to a cleaning method of a heat treatment apparatus which comprises preheating  $\text{ClF}_3$  to its decomposition temperature to result in the decomposition products, Cl and F, and then feeding such into the treatment vessel (independent claim 19). Dependent claims are directed to keeping the treatment vessel at a predetermined temperature (claim 20), the unnecessary film to be removed is the same as that formed on the surface of an object to be processed in the treatment vessel (claim 21), and the treatment vessel is made of quartz or SiC (claim 22).

### The Issues

#### 1. Not Cited in Final Office Action Does Not Mean Not Persuasive

Whether differences between the claimed invention and the prior art may be persuasive even though such differences were not referenced in the final Office action.

#### 2. Obvious to Try Is Not a Legal Standard of Obviousness

Whether obvious to try is not the permissible test of unpatentability under 35 U.S.C. 103(a).

### The Law

1. REBUTTAL ARGUMENTS. No case law holds that rebuttal arguments relating to differences over the prior art can not be persuasive where the differences were not recited in the Office actions. Nowhere in section 2145 of the MPEP, or any part of the MPEP, is it recited that rebuttal arguments relating to differences over the prior art can not be persuasive where the differences were not recited in the Office actions.
2. OBVIOUS TO TRY. Obvious to try is not the legal standard under 35 U.S.C. 103(a). See *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673 (Fed. Cir. 1988)

### The Facts

The Examiner maintained the rejection of claims 19-22 under 35 U.S.C. 103(a) as being unpatentable over Niino et al. in view of JP 07-335563 and as evidenced by Sandhu et al. (US 6,201,219) and CAS No. 7790-91-2 (CAS) or Matsuda et al. (US 5,413,967).

In the Response filed December 15, 2005, Applicants argued that one of ordinary skill in the art would not have been motivated to combine the teachings of Niino et al. with those of JP 07-335563, Sandhu et al. CAS, or Matsuda et al., with a *reasonable* likelihood of *success* as Sandhu et al. does not teach or suggest that at decomposition temperatures,  $\text{NF}_3$  and  $\text{ClF}_3$  and

their decomposition products will be substantially equivalent and exhibit substantially similar properties such that  $\text{NF}_3$  and  $\text{ClF}_3$  may be used interchangeably in the same cleaning processes and apparatuses.

#### *Failure to Consider Rebuttal Arguments*

In the Advisory Action mailed January 17, 2006, the Examiner stated:

Applicants argue that the properties of  $\text{NF}_3$  and  $\text{ClF}_3$  cleaning gases would not be the same at their decomposition temperatures and thus one of ordinary skill in the art would not have been motivated to preheat  $\text{ClF}_3$  to its decomposition temperature ... This is not found persuasive, because nowhere in the Final Office Action such properties are compared.

The Examiner then reiterated his position without addressing Applicants argument that the prior art does not teach or suggest the equivalency of  $\text{NF}_3$  and  $\text{ClF}_3$  and their decomposition products at their decomposition temperatures. The failure to address Applicants rebuttal arguments is erroneous.

Applicants submitted various documents with the Response of December 15, 2005, which evidence that  $\text{NF}_3$  and  $\text{ClF}_3$  produce different decomposition products at decomposition temperatures. The different decomposition products exhibit different properties which may affect their results in different applications.

#### *Incorrect Application of Obvious to Try*

Nowhere did the Examiner address the different properties of the decomposition products. Instead, the Examiner merely asserted that both  $\text{NF}_3$  and  $\text{ClF}_3$  (at their non-decomposition temperatures) are used as cleaning gases which provides the motivation to use  $\text{ClF}_3$  at its decomposition temperature. By not addressing Applicants arguments of the differences between  $\text{NF}_3$  and  $\text{ClF}_3$  at their decomposition temperatures, it seems that the Examiner is applying the "obvious to try test", but this is impermissible. Specifically, the Examiner did not set forth any reason why  $\text{NF}_3$  and  $\text{ClF}_3$  at their decomposition temperatures and their decomposition products would be expected to exhibit the same properties. Clearly, if  $\text{NF}_3$  and  $\text{ClF}_3$  at their decomposition temperatures and their decomposition products do not exhibit the same properties, one of ordinary skill in the art would not expect their interchangeability in a

given process, with a reasonable likelihood of success.

Again, Applicants reiterate that  $\text{NF}_3$  and  $\text{ClF}_3$  have different chemical and physical properties which make them distinctly different gases. Different compounds may exhibit similar properties under certain conditions. Thus, simply pointing to Sandhu et al. as indicating that  $\text{NF}_3$  and  $\text{ClF}_3$  are equivalent under the conditions as contemplated in the process of Sandhu et al. does not create a reasonable likelihood of success in those of ordinary skill in the art that  $\text{NF}_3$  and  $\text{ClF}_3$  are equivalent under different conditions, i.e. decomposition temperatures, in different processes. Much more than simply pointing to the known decomposition temperatures of each gas is needed to reasonably extrapolate that  $\text{NF}_3$  and  $\text{ClF}_3$  would likely exhibit similar properties upon decomposition, when applied in the process of Niino et al.

#### *Motivation Against Risking the Use of $\text{ClF}_3$*

Although toxic gases are used in the semiconductor cleaning arts, why would one be motivated to use a more toxic gas over a less toxic one?

Again, Applicants submit that, assuming *arguendo* that  $\text{NF}_3$  and  $\text{ClF}_3$  are equivalent for use as a cleaning gas at the same temperatures and in the same processes and in the same apparatuses, one ordinarily skilled in the art would not risk the hazards of  $\text{ClF}_3$  if  $\text{NF}_3$  is just as effective.

For instance, the Material Safety Data Sheet for  $\text{NF}_3$  indicates that  $\text{NF}_3$  has a NFPA health rating of 1.  $\text{NF}_3$  NFPA ratings for fire and reactivity are 0. Decomposition of  $\text{NF}_3$  provides  $\text{N}_2$  and HF gas. The Material Safety Data Sheet for  $\text{ClF}_3$ , by contrast, indicates that  $\text{ClF}_3$  has a NFPA health rating of 4 and a reactivity rating of 3. Inhalation of  $\text{ClF}_3$  may cause death.  $\text{ClF}_3$  may spontaneously explode upon exposure to incompatible materials and containers of  $\text{ClF}_3$  may explode if exposed to heat. Further, decomposition of  $\text{ClF}_3$  produces toxic chlorine gas.

One skilled in the art would not have been motivated to risk the hazards of using  $\text{ClF}_3$ , especially at its decomposition temperatures. Nowhere does the cited prior art teach or suggest that the benefits of employing  $\text{ClF}_3$  gas at its decomposition temperatures outweighs the risks of being (1) highly explosive upon exposure to incompatible materials and high temperatures, (2) deathly toxic, and (3) decomposing into toxic chlorine gas.

*Conclusion*

In summary, none of the cited prior art teaches or suggests that  $\text{ClF}_3$  and  $\text{NF}_3$  exhibit equivalent properties at their decomposition temperatures such that they may be used interchangeably in the same processes and apparatuses. The cited prior art does not teach or suggest that the benefits of employing  $\text{ClF}_3$  gas at its decomposition temperatures outweighs its risks such that one would have been motivated to employ  $\text{ClF}_3$  rather than  $\text{NF}_3$ . Thus, one of ordinary skill in the art would not have been motivated to preheat  $\text{ClF}_3$  to its decomposition temperature in the process according to the present invention.

Therefore, Applicants respectfully request that the review panel decide Finding 2 or Finding 3 and withdraw the obviousness rejection. If the review panel decides Finding 2, Applicants would appreciate a proposed amendment if appropriate.